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ABSTRACT

A task force on the use of computers in instruction was appointed by the Maryland Deputy State Superintendent of Schools to respond to requests of state local education agencies for assistance with computer education. One result of the deliberations of that group is this paper, which establishes the programmatic definition for a comprehensive computer education program for the public schools of Maryland. Divided into three main sections, the paper covers computers as the instructional focus, computers as instructional support, and program recommendations. Goals and subgoals are presented for each of the first two topics; the third lists seven recommendations for local education agencies to follow in implementing computer education programs. A list of task force members completes the document. (JB)

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PROGRAMMATIC DEFINITION FOR COMPUTER EDUCATION

ED263911

PREPARED BY
TASK FORCE
ON
USE OF COMPUTERS IN INSTRUCTION

LANGUAGE AND LEARNING IMPROVEMENT BRANCH
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PROGRAMMATIC DEFINITION FOR COMPUTER EDUCATION

INTRODUCTION

This paper establishes the programmatic definition for a comprehensive computer education program for the public schools of Maryland. It is the first in a series of systematic steps undertaken by the Maryland State Department of Education to provide leadership and direction in this area.

A task force on the use of computers in instruction was appointed by the Deputy State Superintendent of Schools to respond to requests of Maryland local education agencies for assistance from the Department on computer education. This development of this paper is one result of the deliberations of this group.

Technology is becoming a broad term encompassing numerous advances in scientific equipment; at the heart of the matter for schools is the computer chip. The chip has allowed the mainframe computer to be transformed into a portable microcomputer with increased capacities for storage, memory, and execution.

The computer has the potential to change our daily lives at school, home, and work. Students *and* teachers need to develop the knowledge, skills, and attitudes that will allow the effective uses of computers in the teaching and learning processes.

A comprehensive computer education program should be provided to all students in Maryland. A comprehensive computer education program is defined in Maryland as a program containing (1) computers as the focus of instruction and (2) computers as instructional support. (see Figure 1)

The programmatic content described here may apply to both students and teachers. The sophistication level and implementation of these goals and subgoals may vary according to LEA program needs.

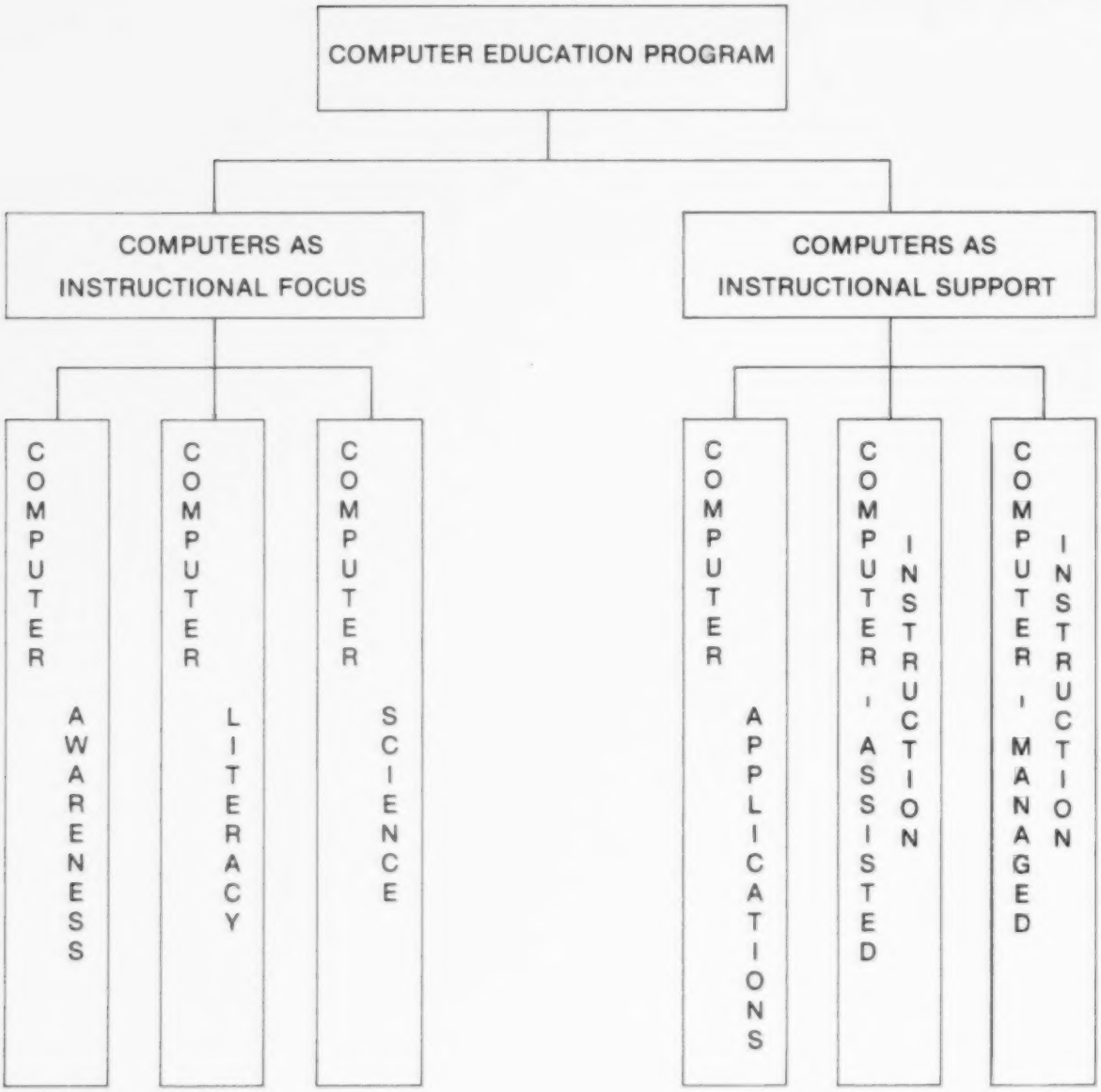

FIGURE 1. Computer Education Program Components

COMPUTERS AS INSTRUCTIONAL FOCUS

The use of computers as the focus of instruction involves these components:

- Computer awareness — An understanding of what a computer is and how it has affected all aspects of our society.*
- Computer literacy — The ability to make effective use of a computer.*
- Computer science — The study of computer systems and how to use them to solve problems. This includes computer languages, programming algorithms, data structures, and the structure of computer systems.

Computer awareness, computer literacy, and computer science form a hierarchical framework for computer education, one building upon the other. Goals I, II, III which follow, are not intended to be specific course descriptions, but strands of a comprehensive computer education program to be further defined and implemented according to local program needs. The importance and time devoted to computer awareness and computer literacy may diminish as society becomes more computer literate. Emphasis may shift from the computer as the instructional focus to the computer as instructional support.

GOALS AND SUBGOALS

GOAL I—To develop computer awareness in all students

Computer awareness consists of the following learnings:

Subgoal A. Capabilities of a computer as a tool designed and operated by humans
Subgoal B. Applications of computers
Subgoal C. Career opportunities of computers
Subgoal D. Advantages and disadvantages of using computers
Subgoal E. Ethical and legal considerations of computer use
Subgoal F. Historical development and possible future uses of computers

*Computer awareness and literacy should be provided all students.

GOAL II—To develop computer literacy in all students

Computer literacy consists of the following learnings:

- Subgoal A. Computer technology vocabulary
- Subgoal B. Components of a computer system
- Subgoal C. How a computer works
- Subgoal D. Operation of a computer system
- Subgoal E. Effective software use
- Subgoal F. Introduction to computer languages

GOAL III—To provide computer science instruction to all interested and able students

Computer science is characterized by the following learnings:

- Subgoal A. Planning and organizing the sequence of steps in order to solve problems through computer use
- Subgoal B. Choosing an appropriate language and developing and writing a program to solve specific problems
- Subgoal C. Evaluating and documenting programs
- Subgoal D. Understanding and using the available capabilities (options) of existing computer hardware
- Subgoal E. Storing and retrieving data in the most efficient manner

COMPUTERS AS INSTRUCTIONAL SUPPORT

The mos' important computer use in a comprehensive program is the use of computers as a support for instruction in all subject areas. Computer applications to effectively teach appropriate skills and knowledges are stressed for all disciplines. Computers as instructional support includes the following components:

- Computer applications — The use of computers as a problem (situation) solving vehicle by teachers and students in all subject areas.
- Computer-assisted instruction — Instruction and practice presented by the computer.
- Computer-managed instruction — The management of instruction through the use of computers.

GOALS AND SUBGOALS

GOAL IV—To use computer applications to enhance appropriate learnings in all subject areas

Typical computer applications are:

A. Information storage, retrieval, and analysis
B. Word processing for composition
C. Simulating experiments and events
D. Illustrating mathematical concepts and solving mathematical problems
E. Creative use of graphics and sound capabilities where appropriate, for instance, art and music
F. Using a computer to record, control, and analyze physical occurrences

GOAL V—To use the computer to deliver appropriate instruction in all subject areas

Types of computer-assisted instruction are:

A. Drill and practice
B. Tutorial
C. Simulation

GOAL VI—To use the computer to manage appropriate aspects of the instructional program

Computer-managed instruction is characterized by the following components:

A. Diagnosis and prescription
B. Recordkeeping and reporting
C. Evaluation and testing
D. Monitoring student progress
E. Attendance, grading, and scheduling
F. Generating curriculum materials

PROGRAM RECOMMENDATIONS

The Maryland State Department of Education Task Force on Use of Computers in Instruction encourages as a comprehensive computer education program the following:

- Computer awareness for all students.
- Computer literacy for all students.
- Computer science for all interested and able students.
- Incorporation of computer applications, computer-assisted instruction, and computer-managed instruction where appropriate to support instruction.

To support implementation of computer education programs, the Task Force recommends that each local education agency:

1. Develop a curriculum plan for computer education including objectives and activities (skills continua) based upon the state programmatic definition;
2. Develop a systematic plan for the acquisition, placement, and use of sufficient hardware and software;
3. Devote adequate resources and personnel to provide assistance in acquiring and using computer hardware and software;
4. Conduct staff development programs for administrative and instructional personnel to support the computer education program;
5. Evaluate the use of computers in the subject areas as a joint effort of curriculum and computer education specialists;
6. Evaluate software both before and after purchase;
7. Conduct a continuous process of research and evaluation of computer based instruction jointly with the state.

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